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## SEARCH REQUEST FORM

JUN-8 2004

Scientific and Technical Information Center

(STIC)

Requester's Full Name: MOLLY CEPERLEY Examiner #: 59757 Date: 06/08/04  
 Art Unit: 1641 Phone Number ~~30~~ 2-0813 Serial Number: 10/307526  
 (Mail Box) and Bldg/Room Location: Rem 3A51 Results Format Preferred (circle) PAPER DISK E-MAIL  
 ↳ Rem 3C70

If more than one search is submitted, please prioritize searches in order of need.

\*\*\*\*\*

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: \_\_\_\_\_

Inventors (please provide full names): \_\_\_\_\_

See Bibliographic data sheet attached.

Earliest Priority Filing Date: 12/05/01

\*For Sequence Searches Only\* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

Please search for the combination of CARBON NANOTUBES and ELECTROCHEMILUMINESC<sup>2</sup> (see claim 17). Also in combination with the metals Ru, Os and Re (claim 21) and Ru(bpy)<sub>3</sub><sup>2+</sup> of claim 23.

↳ bipyridine

Please search for claim 1 and terms of claim 24, 30, 31.

Equivalent terms for nanotubes: fibrils, fibers.

"Carbon nanotubes" also called "graphitic nanotubes".

Other term: chemiluminesc<sup>2</sup>, enzyme, enzyme substrate, ECL (electrochemiluminescence)

\*\*\*\*\*  
 STAFF USE ONLY

Searcher: T. Kuyper

Searcher Phone #: 22557

Searcher Location: 1665

Date Searcher Picked Up: 6/10/04

Date Completed: 6/10/04

Searcher Prep & Review Time: 30 min

Clerical Prep Time: \_\_\_\_\_

Online Time: 30 min

## Type of Search

NA Sequence (#) \_\_\_\_\_

AA Sequence (#) \_\_\_\_\_

Structure (#) \_\_\_\_\_

Bibliographic \_\_\_\_\_

Litigation \_\_\_\_\_

Fulltext \_\_\_\_\_

Patent Family \_\_\_\_\_

Other \_\_\_\_\_

## Vendors and cost where applicable

STN ☒ \_\_\_\_\_

Dialog \_\_\_\_\_

Questel/Orbit \_\_\_\_\_

Dr.Link \_\_\_\_\_

Lexis/Nexis \_\_\_\_\_

Sequence Systems \_\_\_\_\_

WWW/Internet \_\_\_\_\_

Other (specify) \_\_\_\_\_

=> b zcaplus

FILE 'ZCAPLUS' ENTERED AT 16:15:41 ON 10 JUN 2004

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*Considered  
06/15/04  
WZ*

FILE COVERS 1907 - 10 Jun 2004 VOL 140 ISS 24

FILE LAST UPDATED: 9 Jun 2004 (20040609/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> d que 144

L2	13027	SEA	FILE=ZCAPLUS	ABB=ON	PLU=ON	NANOTUBES+OLD,NT/CT
L3	133647	SEA	FILE=ZCAPLUS	ABB=ON	PLU=ON	LUMINESCENCE/CT,CW
L4	286864	SEA	FILE=ZCAPLUS	ABB=ON	PLU=ON	?ELECTROCHEM?/BI
L5	416961	SEA	FILE=ZCAPLUS	ABB=ON	PLU=ON	L3 OR L4
L8	1	SEA	FILE=REGISTRY	ABB=ON	PLU=ON	OSMIUM/CN
L9	1	SEA	FILE=REGISTRY	ABB=ON	PLU=ON	RHENIUM/CN
L12	1	SEA	FILE=REGISTRY	ABB=ON	PLU=ON	RUTHENIUM/CN
L13	47421	SEA	FILE=ZCAPLUS	ABB=ON	PLU=ON	(L8 OR L9) OR L12
L15	118115	SEA	FILE=ZCAPLUS	ABB=ON	PLU=ON	RUTHENIUM? OR OSMIUM? OR RHENIUM?
L16	122481	SEA	FILE=ZCAPLUS	ABB=ON	PLU=ON	L13 OR L15
L17	16759	SEA	FILE=ZCAPLUS	ABB=ON	PLU=ON	?NANOTUBE?/BI
L18	16801	SEA	FILE=ZCAPLUS	ABB=ON	PLU=ON	L17 OR L2
L19	14468	SEA	FILE=ZCAPLUS	ABB=ON	PLU=ON	L18(L) (CARBON? OR GRAPHIT?)
L20	759	SEA	FILE=ZCAPLUS	ABB=ON	PLU=ON	L5 AND L19
L21	22	SEA	FILE=ZCAPLUS	ABB=ON	PLU=ON	L20 AND L16
L22	6	SEA	FILE=ZCAPLUS	ABB=ON	PLU=ON	L21 AND P/DT
L44	6	SEA	FILE=ZCAPLUS	ABB=ON	PLU=ON	L22 AND (PY<=2001 OR PRY<=2001 OR AY<=2001)

=> b wpix

FILE 'WPIX' ENTERED AT 16:15:56 ON 10 JUN 2004

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FILE LAST UPDATED: 3 JUN 2004 <20040603/UP>  
MOST RECENT DERWENT UPDATE: 200435 <200435/DW>  
DERWENT WORLD PATENTS INDEX SUBSCRIBER FILE, COVERS 1963 TO DATE

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>>> THE DISPLAY LAYOUT HAS BEEN CHANGED TO ACCOMODATE THE  
NEW FORMAT GERMAN PATENT APPLICATION AND PUBLICATION  
NUMBERS. SEE ALSO:  
<http://www.stn-international.de/archive/stnews/news0104.pdf> <<<

>>> SINCE THE FILE HAD NOT BEEN UPDATED BETWEEN APRIL 12-16  
THERE WAS NO WEEKLY SDI RUN <<<

=> d que 130

L25 1733 SEA FILE=WPIX ABB=ON PLU=ON NANOTUBE?/BIX  
L27 43565 SEA FILE=WPIX ABB=ON PLU=ON ?LUMINESCEN?/BIX  
L28 49 SEA FILE=WPIX ABB=ON PLU=ON L27 AND L25  
L29 15745 SEA FILE=WPIX ABB=ON PLU=ON (RUTHENIUM? OR OSMIUM? OR  
RHENIUM?)/BIX  
L30 5 SEA FILE=WPIX ABB=ON PLU=ON L29 AND L28

=> dup rem 144 130

FILE 'ZCAPLUS' ENTERED AT 16:16:11 ON 10 JUN 2004  
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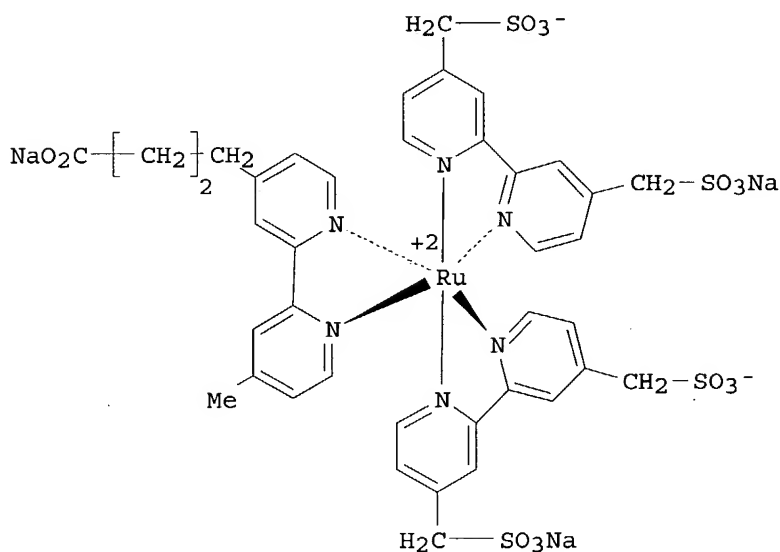
FILE 'WPIX' ENTERED AT 16:16:11 ON 10 JUN 2004  
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PROCESSING COMPLETED FOR L44  
PROCESSING COMPLETED FOR L30  
L48 10 DUP REM L44 L30 (1 DUPLICATE REMOVED)

=> d all 148 1-10

L48 ANSWER 1 OF 10 ZCAPLUS COPYRIGHT 2004 ACS on STN  
AN 2003:23089 ZCAPLUS  
DN 138:86125  
ED Entered STN: 10 Jan 2003  
TI ECL labels having improved non-specific binding properties, methods of  
using, and kits containing the same  
IN Sigal, George B.; Tjiong, Howie; Dong, Liwen; Masood, Athar; Titmas,  
Richard C.  
PA Igen International, Inc., USA  
SO PCT Int. Appl., 60 pp.  
CODEN: PIXXD2  
DT Patent  
LA English

IC ICM G01N  
 CC 9-14 (Biochemical Methods)  
 Section cross-reference(s): 28, 29  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2003002974	A2	20030109	WO 2002-US19788	20020621 <--
	WO 2003002974	A3	20030410		
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	US 2003027357	A1	20030206	US 2001-896974	20010629 <--
	EP 1409459	A2	20040421	EP 2002-749629	20020621 <--
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
PRAI	US 2001-896974	A	20010629 <--		
	WO 2002-US19788	W	20020621		
OS	MARPAT 138:86125				
GI					



AB Bipyridine or phenanthroline ligands presenting functional groups that prevent non-specific binding (in particular, neg. charged functional groups that are unaffected by standard conditions for conjugating biol. reagents through amide bonds) are described as are luminescent metal complexes comprising these ligands. The use of luminescent **ruthenium** and **osmium** complexes comprising these ligands in **electrochemiluminescence** assays shows that the use of these labels can significantly reduce the amount of non-specific binding observed relative to assays carried out using reagents labeled with analogous labels that do not present functional groups that decrease non-specific

binding. **Ruthenium** bipyridine ligand complex I (preparation given) was reacted with NHS and used to label antibodies to  $\alpha$ -fetoprotein (AFP). AFP sandwich immunoassays used streptavidin-coated magnetic particles, biotinylated capture antibodies, and I-labeled detection antibodies. Label I gave slightly less specific signal than a **ruthenium** complex containing carboxylic acid, but had drastically less nonspecific signal, especially for heavily labeled antibodies.

ST **electrochemiluminescence** assay label prevention nonspecific binding; bipyridine ligand luminescent metal complex nonspecific binding; phenanthroline ligand luminescent metal complex nonspecific binding; functional group prevention nonspecific binding ECL label; **ruthenium** bipyridine ligand complex labeled antibody; sandwich immunoassay reagent **ruthenium** bipyridine ligand complex

IT Blood analysis  
Human  
Luminescence  
Luminescence spectroscopy  
Test kits  
(ECL labels having improved non-specific binding properties and assay kits containing them)

IT  $\alpha$ -Fetoproteins  
RL: ANT (Analyte); ANST (Analytical study)  
(ECL labels having improved non-specific binding properties and assay kits containing them)

IT Antibodies  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(ECL labels having improved non-specific binding properties and assay kits containing them)

IT Electrolytes  
(as assay component; ECL labels having improved non-specific binding properties and assay kits containing them)

IT Electrodes  
(as support for sandwich immunoassay; ECL labels having improved non-specific binding properties and assay kits containing them)

IT Antibodies  
RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent); USES (Uses)  
(biotinylated; ECL labels having improved non-specific binding properties and assay kits containing them)

IT Functional groups  
(charged, on bipyridine or phenanthroline ligands for reducing nonspecific binding; ECL labels having improved non-specific binding properties and assay kits containing them)

IT Chemiluminescence spectroscopy  
Luminescence, chemiluminescence  
(electrochemiluminescence; ECL labels having improved non-specific binding properties and assay kits containing them)

IT Buffers  
Detergents  
Preservatives  
Stabilizing agents  
(in assay kits; ECL labels having improved non-specific binding properties and assay kits containing them)

IT Nucleic acids  
Nucleotides, preparation  
Peptides, preparation  
Proteins  
RL: ARG (Analytical reagent use); SPN (Synthetic preparation); ANST (Analytical study); PREP (Preparation); USES (Uses)  
(labeled, with luminescent metal complexes having reduced nonspecific

- binding; ECL labels having improved non-specific binding properties and assay kits containing them)
- IT Antibodies  
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)  
(labeled, with **ruthenium** complexes; ECL labels having improved non-specific binding properties and assay kits containing them)
- IT Peptidomimetics  
(labeling with luminescent metal complexes having functional groups with reduced nonspecific binding; ECL labels having improved non-specific binding properties and assay kits containing them)
- IT Amino acids, reactions  
Nucleic acids  
Nucleosides, reactions  
Nucleotides, reactions  
Peptide nucleic acids  
Peptides, reactions  
Proteins  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(labeling with luminescent metal complexes having functional groups with reduced nonspecific binding; ECL labels having improved non-specific binding properties and assay kits containing them)
- IT Magnetic particles  
(sandwich immunoassays on; ECL labels having improved non-specific binding properties and assay kits containing them)
- IT Immunoassay  
(sandwich; ECL labels having improved non-specific binding properties and assay kits containing them)
- IT Reagents  
RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent); USES (Uses)  
(substituted bipyridine or phenanthroline ligands reacting with binding; ECL labels having improved non-specific binding properties and assay kits containing them)
- IT Enzymes, biological studies  
RL: ARG (Analytical reagent use); BSU (Biological study, unclassified); CAT (Catalyst use); ANST (Analytical study); BIOL (Biological study); USES (Uses)  
(substituted bipyridine or phenanthroline ligands reacting with substrate for; ECL labels having improved non-specific binding properties and assay kits containing them)
- IT Biological materials  
(substituted bipyridine or phenanthroline ligands reacting with; ECL labels having improved non-specific binding properties and assay kits containing them)
- IT Coordination compounds  
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)  
(with bipyridine or phenanthroline ligands having functional groups preventing nonspecific binding; ECL labels having improved non-specific binding properties and assay kits containing them)
- IT 7440-04-2D, **Osmium**, complexes with bipyridine or phenanthroline ligands having functional groups preventing nonspecific binding 7440-18-8D, **Ruthenium**, complexes with bipyridine or phenanthroline ligands having functional groups preventing nonspecific binding  
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)  
(ECL labels having improved non-specific binding properties and assay kits containing them)
- IT 9013-20-1D, Streptavidin, labeled with Traut's reagent, immobilized on composite electrode support  
RL: ARG (Analytical reagent use); DEV (Device component use); TEM

(Technical or engineered material use); ANST (Analytical study); USES (Uses)  
 (ECL labels having improved non-specific binding properties and assay kits containing them)

IT 58-85-5D, Biotin, conjugates with capture antibody 482618-39-3  
 482618-40-6 482618-41-7  
 RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent); USES (Uses)  
 (ECL labels having improved non-specific binding properties and assay kits containing them)

IT 482618-42-8P  
 RL: ARG (Analytical reagent use); RCT (Reactant); SPN (Synthetic preparation); ANST (Analytical study); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)  
 (ECL labels having improved non-specific binding properties and assay kits containing them)

IT 1134-35-6 1662-01-7 3279-26-3, Methyldichlorophosphite 6066-82-6, N-Hydroxysuccinimide 7757-83-7, Sodium sulfite 10049-08-8, Ruthenium trichloride 12125-08-5 26412-87-3, Sulfur trioxide pyridine 33821-94-2 52746-49-3 71071-46-0 109073-77-0, 4,4'-Bis-hydroxymethyl-2,2'-bipyridine 114527-28-5 134457-14-0 154476-57-0 482618-33-7  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (ECL labels having improved non-specific binding properties and assay kits containing them)

IT 100137-02-8P, [2,2'-Bipyridine]-4,4'-dicarboxamide 104313-15-7P  
 104313-16-8P, [2,2'-Bipyridine]-4,4'-dibutanol 106548-41-8P  
 135804-28-3P 482366-07-4P 482366-14-3P 482366-30-3P 482366-34-7P  
 482618-43-9P 482618-44-0P 482618-45-1P 482618-49-5P 482618-52-0P  
 482618-53-1P 482618-54-2P 482618-56-4P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
 (ECL labels having improved non-specific binding properties and assay kits containing them)

IT 482618-48-4P 482618-50-8P 482618-51-9P 482618-55-3P  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (ECL labels having improved non-specific binding properties and assay kits containing them)

IT 24937-78-8  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (carbon nanotubes dispersed in, as composite electrode support; ECL labels having improved non-specific binding properties and assay kits containing them)

IT 6539-14-6, Traut's reagent  
 RL: ARG (Analytical reagent use); DEV (Device component use); TEM (Technical or engineered material use); ANST (Analytical study); USES (Uses)  
 (immobilized streptavidin labeled with; ECL labels having improved non-specific binding properties and assay kits containing them)

IT 7440-44-0, Carbon, uses  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (nanotubes dispersed in ethylene-co-vinyl acetate, as composite electrode support; ECL labels having improved non-specific binding properties and assay kits containing them)

IT 7664-41-7, Ammonia, reactions 64987-85-5, SMCC  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (plastic composite electrodes treatment with; ECL labels having improved non-specific binding properties and assay kits containing them)

IT 66-71-7D, 1,10-Phenanthroline, derivs., metal complexes 366-18-7D,  
2,2'-Bipyridine, derivs., metal complexes  
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)  
(with functional groups preventing nonspecific binding; ECL labels  
having improved non-specific binding properties and assay kits containing  
them)

L48 ANSWER 2 OF 10 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 2003-333063 [31] WPIX

CR 2003-301098 [29]; 2003-313167 [30]

DNN N2003-266918 DNC C2003-086473

TI Composition useful for performing **electrochemiluminescence**  
assays comprises a pH buffer and a phosphospecific antibody.

DC B04 D16 S03

IN ALTUNATA, S; BILLADEAU, M A; GLEZER, E N; HELMS, L; LELAND, J K; LEYTNER,  
S; MARTIN, M; SIGAL, G; TSIONSKY, M

PA (ALTU-I) ALTUNATA S; (BILL-I) BILLADEAU M A; (GLEZ-I) GLEZER E N; (HELM-I)  
HELMS L; (LELA-I) LELAND J K; (LEYT-I) LEYTNER S; (MART-I) MARTIN M;  
(SIGA-I) SIGAL G; (TSIO-I) TSIONSKY M; (MESO-N) MESO SCALE TECHNOLOGIES  
LLC

CYC 100

PI WO 2003023380 A1 20030320 (200331)\* EN 52 G01N021-76

RW: AT BE BG CH CY CZ DE DK EA EE ES FI FR GB GH GM GR IE IT KE LS LU  
MC MW MZ NL OA PT SD SE SK SL SZ TR TZ UG ZM ZW

W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK  
DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR  
KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT  
RO RU SD SE SG SI SK SL TJ TM TN TR TT TZ UA UG US UZ VN YU ZA ZM  
ZW

US 2003175803 A1 20030918 (200362) C12Q001-70

ADT WO 2003023380 A1 WO 2002-US28803 20020910; US 2003175803 A1 Provisional US  
2001-318289P 20010910, Provisional US 2002-363498P 20020311, US  
2002-238437 20020910

PRAI US 2002-363498P 20020311; US 2001-318289P 20010910;  
US 2002-238437 20020910

IC ICM C12Q001-70; G01N021-76

ICS C07K016-40; G01N033-53

AB WO2003023380 A UPAB: 20030928

NOVELTY - A composition (C1) comprises a pH buffer and a phosphospecific  
antibody.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the  
following:

(1) a composition (C2) comprising the pH buffer, a phospho-peptide  
specific antibody and a phosphopeptide that binds the phospho-peptide  
specific antibody;

(2) an apparatus adapted for performing  
**electrochemiluminescence** (ECL) assays comprising (C1)/(C2);

(3) a kit comprising the composition in at least one container and an  
assay module comprising at least one working electrode;

(4) a method of performing an ECL method involving applying  
electrochemical energy to the composition;

(5) a method (M2) of performing an assay using the composition  
involving forming an assay mixture comprising the composition and a kinase  
product and forming a complex comprising the kinase product and the  
phospho-specific antibody;

(6) a method (M3) of performing an assay involving forming a complex  
comprising a kinase product and the phospho-specific antibody. The complex  
is not exposed to inorganic phosphate;

(7) a composition (C3) for use in the ECL method, comprising the pH  
buffer and the ECL co-reactant. The pH buffer is glycylglycine and/or



tris(hydroxymethyl)aminomethane. The ECL co-reactant comprises a tertiary amine (preferably tripropylamine);

(8) a composition (C4) for use in ECL method, comprising the pH buffer, a Ru- or Os-containing ECL label or the ECL co-reactant. The pH buffer is not inorganic phosphate;

(9) a reagent (R1) for use in the ECL method comprising (C3)/(C4);

(10) a reagent (R2) for conducting ECL assay comprising the pH buffer and the Ru- or Os-containing ECL moiety. In the assay, the electromagnetic radiation is emitted by an assay composition comprising members selected from a metal-containing ECL moiety (a1) capable of being converted to an excited state from which electromagnetic radiation is emitted; the ECL co-reactant which when oxidized forms a strong reducing agent; and an electrolyte capable of functioning as a medium in which the ECL moiety and the amine or amine moiety can be oxidized;

(11) a kit (K1) for use in the ECL method comprising the pH buffer and the ECL co-reactant in at least one container;

(12) a kit (K2) for use in the ECL method, comprising in at least one container, the pH buffer, the Ru- or Os-containing ECL label and the ECL co-reactant;

(13) a method of qualitatively or quantitatively effecting a specific-binding assay in (C1);

(14) a method of qualitatively or quantitatively effecting a specific-binding non-wash assay using a composition comprising the pH buffer substantially free of inorganic phosphate;

(15) a method (M4) of performing a kinase assay using a composition comprising an ECL label and at least one reagent selected from kinase, a kinase substrate and/or a kinase product;

(16) a method (M5) of performing an assay involving forming a complex comprising the kinase product and the phospho-specific antibody, inducing a metal-containing ECL moiety to emit electromagnetic radiation; and detecting emitted electromagnetic radiation. The complex is not exposed to inorganic phosphate;

(17) a method (M6) for inducing ECL in the presence of a composition comprising the ECL label, the ECL co-reactant and the pH buffer, which is not phosphate;

(18) an ECL assay buffer comprising the ECL co-reactant and at least one non-phosphate-based pH buffer;

(19) a composition (C6) comprising 3-(di-n-propylamino)-propanesulfonic acid or 4-(di-n-propylamino)-butanesulfonic acid;

(20) a method of generating ECL involving either contacting the ECL label with the assay buffer to induce ECL and detecting the emitted ECL; or contacting the ECL label with (C6)/the ECL co-reactant, inducing the ECL label to emit ECL and detecting the ECL; or inducing (C6) to emit ECL and detecting the ECL. The co-reactant is a tertiary amine other than tripropylamine;

(21) a composition (C5) comprising the ECL label, a non-triethylamine (TEA) ECL co-reactant and at least one phenyl ether-containing detergent;

(22) a method of inducing ECL using (C6);

(23) a kit (K3) comprising, in at least one container, the ECL label, a non-TEA ECL co-reactant and at least one phenyl ether-containing detergent;

(24) a kit containing, in at least one container, at least one ECL assay buffer comprising at least one trialkylamine non-TEA co-reactant;

(25) a kit comprising, in at least one container, the metal-containing ECL label and at least one co-reactant selected from 3-(di-n-propylamino)-propanesulfonic acid and/or 4-(di-n-propylamino)-butanesulfonic acid;

(26) a method of inducing ECL comprising contacting the ECL label with the ECL co-reactant. The co-reactant is a tertiary amine other than tri-n-propylamine and the label is attached to the working electrode;

(27) a method (M7) of performing an ECL assay involving forming a composition comprising the label(s) and the co-reactant. The co-reactant is the tertiary amine other than TPA and the ECL label is attached to the working electrode; applying electrochemical energy to induce the label to emit ECL; and detecting the emitted ECL;

USE - For performing ECL assays; for effecting a specific-binding (such as non-wash) assay; for performing a kinase assay; for generating and inducing ECL (all claimed). For generating the emission of electromagnetic radiation; for the detection and/or quantification of at least one analyte of interest in antigen-antibody interaction, ligand-receptor interaction, DNA and RNA interaction and enzymatic reactions. To test variety of samples (e.g. solid, emulsion, suspension, liquid or gas form, which are derived from e.g. cells, cell-derived products, waste or drinking water, food, beverages, pharmaceutical composition, blood, animal byproducts, plants and plant byproducts, skin samples, oils, extracts, environmental sample, organic solvent or air) which may contain an analyte or activity of interest

ADVANTAGE - The ECL assay buffer provides a suitable environment for efficiently inducing ECL labels to emit ECL and for sensitively measuring ECL labels via the measurement of the ECL. The compositions are substantially free of the inorganic phosphates (less than 20 mM), thus improving the performance of assays employing phospho-specific antibodies and greatly reducing interference between the phosphate of the pH buffer and the phospho-specific antibodies. The composition also gives high signal to background ratios in ECL assays.

Dwg. 0/6

FS CPI EPI

FA AB; DCN

MC CPI: B04-G01; B04-N04; B11-C07A2; B12-K04A; D05-H09

EPI: S03-E04E

L48 ANSWER 3 OF 10 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 2003-428918 [40] WPIX

CR 2003-221275 [21]

DNN N2003-342382 DNC C2003-113196

TI Conjugated **electroluminescent** polymer for use in semiconductive composition, comprises monomer units having specific formula.

DC A26 A85 L03 U11 U12 U14 X26

IN PEI, Q

PA (PEIQ-I) PEI Q

CYC 1

PI US 2003013843 A1 20030116 (200340)\* 26 C08G073-00

ADT US 2003013843 A1 CIP of US 2001-864704 20010523, US 2002-153229 20020521

PRAI US 2002-153229 20020521; US 2001-864704 20010523

IC ICM C08G073-00

AB US2003013843 A UPAB: 20030624

NOVELTY - A conjugated **electroluminescent** polymer comprises monomer unit having specific formula.

DETAILED DESCRIPTION - A conjugated **electroluminescent** polymer comprises monomer unit having formula (I).

Ar1, Ar2 = monocyclic, bicyclic or polycyclic arylene, heteroarylene, substituted arylene or substituted heteroarylene;

L = (substituted) alkylene, (substituted) alkenylene, (substituted) heteroalkylene, (substituted) heteroalkenylene, (substituted) arylene, (substituted) heteroarylene and their combinations;

Q = heteroatom;

m, p, q, x = 0 or 1;

Q1 and Q2 = H, (substituted) aryl, (substituted) heteroaryl, (substituted) alkyl and (substituted) heteroalkyl;

Q3 = (substituted) alkyl or (substituted) heteroalkyl;

A- = negatively charged counterion.

When m is 1, Q1 and Q2 are other than H; and when p is zero q is zero.

INDEPENDENT CLAIMS are included for the following:

- (1) a semiconductive composition comprising the polymer or copolymer;
- (2) a conductive composition comprising the polymer or copolymer as a doped conjugated polymer;
- (3) **electroluminescent** device having an organic light emitting layer comprising the polymer or copolymer disposed between a hole injecting electrode and an electron injecting electrode;
- (4) field effect transistor;
- (5) photodetector device comprising a semiconductive layer composed of the polymer or copolymer;
- (6) photovoltaic device useful for generation of electrical power;
- (7) light emitting electrochemical cell;
- (8) an electrochemical sensor; and
- (9) a cavity emission **electroluminescent** device.

USE - As **electroluminescent** material for **electroluminescent** device, field effect transistor, photodetector device, photovoltaic device, light emitting electrochemical device, electrochemical sensor and cavity emission **electroluminescent** device (all claimed). Also, used in laser diodes, rechargeable batteries, capacitors, super capacitors, electrochromic devices, electrode modifying materials, light emitting electrochemical cells and in optoelectronic devices such as photorefractive devices, optical switches and optical data storage devices.

ADVANTAGE - The novel polymer is blue light emitting and retain semiconductivity, **photoluminescence**, **electroluminescence** efficiency, tensile strength, thermal, chemical and photochemical stability.

DESCRIPTION OF DRAWING(S) - The figure illustrates the **electroluminescent** spectrum of light emitting diode.

Dwg.3/3

FS CPI EPI

FA AB; GI

MC CPI: A05-J; A09-A03A; A12-E11C; L03-G04A; L03-G05F; L04-E01A; L04-E05D

EPI: U11-A01F; U11-A15B; U12-A01B; U12-A02A2X; U12-A02B5X; U12-B03C;

U12-D02A; U14-A02; U14-J02D2; U14-K02; X26-J

L48 ANSWER 4 OF 10 ZCAPLUS COPYRIGHT 2004 ACS on STN

AN 2002:906594 ZCAPLUS

DN 138:10525

ED Entered STN: 29 Nov 2002

TI Modification of **carbon nanotubes** by oxidation with peroxygen compounds

IN Niu, Chunming; Moy, David; Ma, Jun; Chishti, Asif

PA Hyperion Catalysis International, Inc., USA

SO PCT Int. Appl., 44 pp.

CODEN: PIXXD2

DT **Patent**

LA English

IC ICM D01F009-12

CC 76-10 (Electric Phenomena)

Section cross-reference(s): 57

FAN.CNT 2

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002095098	A1	20021128	WO 2002-US15828	20020517 <--
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,				

GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,  
 LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH,  
 PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ,  
 UA, UG, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM  
 RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH,  
 CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR,  
 BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

US 2003039604 A1 20030227 US 2001-861370 20010518 <--

PRAI US 2001-861370 A 20010518 <--

AB The modification method comprises contacting **carbon nanotubes** of <1  $\mu\text{m}$  diameter with a peroxygen compound selected from organic peroxoacids, inorg. peroxyacids, organic hydroperoxides, or salts, under

oxidation conditions in presence of a metal oxide catalyst, and further functionalization with organic functional groups. The peroxoacids or salts are selected from Na persulfate, K persulfate,  $\text{NH}_4$  persulfate,  $\text{NH}_4$  dichromate, K dichromate Na dichromate peroxydisulfuric acid, and potassium peroxydisulfate. Oxidation of the **nanotubes** promotes dispersion of aggregates of **nanotubes**. The dispersed **nanotubes** having 0 functional groups on the surface, are filtered and treated at 200-900° for 0.5-24 h to form mats. Alternatively, the oxidized **nanotubes** are treated with reagents to introduce secondary functional groups, crosslinking agents, and binders forming rigid porous structures that are pyrolyzed at 300-1000°. The oxidized, dispersed **nanotubes** are further dispersed by sonication, filtered to produce mats; the mats are used to fabricate electrodes for elec. capacitors. Aggregates of **carbon nanotubes** were oxidized in 1M  $(\text{NH}_4)_2\text{S}_2\text{O}_8$ /1M  $\text{H}_2\text{SO}_4$  solution for 1-7 days forming thick arrays which were filtered, washed and dried; further, sonication in water containing 5 drops Triton X-100 for 5 min, followed by filtration, resulted in mats that were dried at 100° and treated at 350° in air for 4 h. Electrodes of 0.5 in diameter were fabricated from the mats and assembled into **electrochem.** capacitors using a Celgard separator and 38% aqueous  $\text{H}_2\text{SO}_4$  as electrolyte; the electrodes showed excellent frequency response.

ST **carbon nanotube** surface oxidn aggregate dispersion mat porous structure; functional group surface **carbon nanotube** pyrolysis rigid structure; electrode **carbon nanotube** capacitor frequency response

IT Capacitor electrodes

**Carbonization**

Electrolytic capacitors

Heat treatment

Surface acidity

(aggregate dispersion of **carbon nanotubes** by surface oxidation and further functionalization to produce rigid material fabricated into capacitor electrodes)

IT Phenolic resins, uses

Polyamides, uses

RL: NUU (Other use, unclassified); USES (Uses)

(binder; aggregate dispersion of **carbon nanotubes** by surface oxidation and further functionalization to produce rigid material fabricated into capacitor electrodes)

IT **Nanotubes**

(**carbon**; aggregate dispersion of **carbon nanotubes** by surface oxidation and further functionalization to produce rigid material fabricated into capacitor electrodes)

IT Polyoxyalkylenes, uses

RL: NUU (Other use, unclassified); USES (Uses)

(dispersing medium; aggregate dispersion of **carbon**

- nanotubes** by surface oxidation and further functionalization to produce rigid material fabricated into capacitor electrodes)
- IT Carboxylic acids, uses  
 RL: NUU (Other use, unclassified); USES (Uses)  
 (peroxy, oxidant; aggregate dispersion of **carbon nanotubes** by surface oxidation and further functionalization to produce rigid material fabricated into capacitor electrodes)
- IT Oxidation  
 (surface; aggregate dispersion of **carbon nanotubes** by surface oxidation and further functionalization to produce rigid material fabricated into capacitor electrodes)
- IT 7440-44-0, **Carbon**, processes  
 RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
 (aggregate dispersion of **carbon nanotubes** by surface oxidation and further functionalization to produce rigid material fabricated into capacitor electrodes)
- IT 9002-88-4, Polyethylene 9003-53-6, Polystyrene 9004-34-6, Cellulose, uses  
 RL: NUU (Other use, unclassified); USES (Uses)  
 (binder; aggregate dispersion of **carbon nanotubes** by surface oxidation and further functionalization to produce rigid material fabricated into capacitor electrodes)
- IT 56-81-5, Glycerin, uses 7732-18-5, Water, uses 9002-98-6 25322-68-3, Poly(ethylene glycol) 25322-69-4, Poly(propylene glycol)  
 RL: NUU (Other use, unclassified); USES (Uses)  
 (dispersing medium; aggregate dispersion of **carbon nanotubes** by surface oxidation and further functionalization to produce rigid material fabricated into capacitor electrodes)
- IT 7664-93-9, Sulfuric acid, uses  
 RL: DEV (Device component use); NUU (Other use, unclassified); USES (Uses)  
 (oxidant and capacitor electrolyte; aggregate dispersion of **carbon nanotubes** by surface oxidation and further functionalization to produce rigid material fabricated into capacitor electrodes)
- IT 64-19-7, Acetic acid, uses 75-91-2, tert-Butyl hydroperoxide 80-15-9, Cumene hydroperoxide 93-59-4, Peroxybenzoic acid 7722-84-1, Hydrogen peroxide, uses 7722-86-3, Peroxysulfuric acid 7727-21-1, Potassium persulfate 7775-27-1, Sodium persulfate 7778-50-9, Potassium dichromate 7789-09-5, Ammonium dichromate 10361-76-9, Potassium peroxymonosulfate 10588-01-9, Sodium dichromate  
 RL: NUU (Other use, unclassified); USES (Uses)  
 (oxidant; aggregate dispersion of **carbon nanotubes** by surface oxidation and further functionalization to produce rigid material fabricated into capacitor electrodes)
- IT 1313-27-5, Molybdenum oxide (MoO<sub>3</sub>), uses 1314-35-8, Tungsten oxide (WO<sub>3</sub>), uses 1314-62-1, Vanadium oxide (V<sub>2</sub>O<sub>5</sub>), uses 1333-82-0, Chromium oxide (CrO<sub>3</sub>) 1345-25-1, Ferrous oxide, uses 7446-08-4, Selenium oxide (SeO<sub>2</sub>) 7720-78-7, Iron sulfate (FeSO<sub>4</sub>) 13463-67-7, Titanium oxide (TiO<sub>2</sub>), uses 20427-56-9, **Ruthenium** oxide (RuO<sub>4</sub>) 20816-12-0, **Osmium** oxide (OsO<sub>4</sub>)  
 RL: CAT (Catalyst use); USES (Uses)  
 (oxidation catalyst; aggregate dispersion of **carbon nanotubes** by surface oxidation and further functionalization to produce rigid material fabricated into capacitor electrodes)
- IT 7727-54-0, Ammonium peroxydisulfate ((NH<sub>4</sub>)<sub>2</sub>S<sub>2</sub>O<sub>8</sub>)  
 RL: NUU (Other use, unclassified); USES (Uses)  
 (oxidation reagent; aggregate dispersion of **carbon nanotubes** by surface oxidation and further functionalization to produce rigid material fabricated into capacitor electrodes)

produce rigid material fabricated into capacitor electrodes)  
 IT 9002-93-1, Triton X-100  
 RL: NUU (Other use, unclassified); USES (Uses)  
 (sonication agent; aggregate dispersion of **carbon nanotubes** by surface oxidation and further functionalization to produce rigid material fabricated into capacitor electrodes)

RE.CNT 1 THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Tennent; US 6099965 A 2000 ZCAPLUS

L48 ANSWER 5 OF 10 ZCAPLUS COPYRIGHT 2004 ACS on STN

AN 2003:410743 ZCAPLUS

DN 138:377483

ED Entered STN: 30 May 2003

TI Manufacture of high-capacity **electrochemical** capacitor

IN Xie, Jingying; Wang, Xiaofeng; Liu, Yu; Zhang, Xigui

PA Shanghai Inst. of Metallurgy, Chinese Academy of Sciences, Peop. Rep. China

SO Faming Zhuanli Shenqing Gongkai Shuomingshu, 10 pp.

CODEN: CNXXEV

DT **Patent**

LA Chinese

IC ICM H01G009-042

ICS H01G090-35; H01G009-02; H01G013-00; H01M006-04; H01M010-04

CC 76-10 (Electric Phenomena)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	CN 1345074	A	20020417	CN 2001-132080	20011031 <--
PRAI	CN 2001-132080		20011031 <--		

AB The capacitor consists of pos. and neg. electrodes prepared from oxide or hydroxide of Ru and a composite material of activated C having high sp. surface area, acidic or alkaline electrolyte, and insulating polymer membranes between the electrolyte and an electrode. The electrodes are manufactured by dispersing a **carbonaceous** material having high sp. surface area such as activated C, nanometer C fibers, C **nanotubes**, and/or aerosol of C in a 0.05-0.5M aqueous solution of halide or sulfate of Ru, adding NaOH or KOH to the solution under stirring to pH 7, stirring for 5 h, filtering, drying at 80°, dewatering by heating at 150° for 10 min, pulverizing, mixing the obtained powder with a conductor (such as **graphite**, C black, and/or powdered Ni) and a binder such as PTFE or poly(vinylidene fluoride) to obtained paste, coating the paste on a current collector (such as sponge Ni, punched Ni-electroplated stainless steel, Al foil, Cu foil), pressing, drying, and cutting to size. The electrolyte is an aqueous solution or a nonaq. (such as alc., propylene **carbonate**) solution of LiOH, KOH, or NaOH, or H2SO4. manufacture  
 ST electrolytic **ruthenium** oxide hydroxide capacitor  
 IT Electrolytes  
 Electrolytic capacitors  
 Surface area

(**electrochem.** capacitor based on **ruthenium** oxide or hydroxide with high capacitance)

IT Fluoropolymers, reactions

RL: FMU (Formation, unclassified); RCT (Reactant); FORM (Formation, nonpreparative); RACT (Reactant or reagent)

(**electrochem.** capacitor based on **ruthenium** oxide or hydroxide with high capacitance)

IT Carbon fibers, properties

RL: PNU (Preparation, unclassified); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(electrochem. capacitor based on **ruthenium** oxide or hydroxide with high capacitance)

IT 108-32-7, Propylene carbonate 1310-58-3, Potassium hydroxide (KOH), reactions 1310-65-2, Lithium hydroxide (LiOH) 1310-73-2, Sodium hydroxide (NaOH), reactions 7429-90-5, Aluminum, reactions 7440-50-8, Copper, reactions 7664-93-9, Sulfuric acid, reactions 12597-68-1, Stainless steel, reactions 24937-79-9, Poly(vinylidene fluoride)  
RL: FMU (Formation, unclassified); RCT (Reactant); FORM (Formation, nonpreparative); RACT (Reactant or reagent)

(electrochem. capacitor based on **ruthenium** oxide or hydroxide with high capacitance)

IT 11113-84-1P, **Ruthenium** oxide 56321-86-9P, **Ruthenium** hydroxide  
RL: PNU (Preparation, unclassified); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(electrochem. capacitor based on **ruthenium** oxide or hydroxide with high capacitance)

L48 ANSWER 6 OF 10 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 2003-219973 [21] WPIX

DNN N2003-175417 DNC C2003-055848

TI Fabrication of carbon **nanotube** film used in making field emission devices; involves subsequently synthesizing metallic catalyst layer and carbon **nanotube** film using hydrocarbon precursor at low temperature.

DC E36 L02 L03 P42 S02 S03 U11 U12 V05 X25 X26

IN SUN, Y; SUN, Z

PA (SUNY-I) SUN Y; (SUNZ-I) SUN Z

CYC 1

PI US 2002160111 A1 20021031 (200321)\* 15 B05D003-02

ADT US 2002160111 A1 Provisional US 2001-285977P 20010425, US 2002-127296 20020422

PRAI US 2001-285977P 20010425; US 2002-127296 20020422

IC ICM B05D003-02

ICS C23C016-00

AB US2002160111 A UPAB: 20030328

NOVELTY - A carbon **nanotube** film is fabricated by subsequently synthesizing catalyst layer and carbon **nanotube** film using hydrocarbon precursor. The catalyst layer consists of transition metals and related alloys, compound or composite. The carbon **nanotube** film is synthesized by chemical vapor deposition at a pressure of 10<sup>-4</sup> torr to 1 atmosphere and a temperature of 300-800 deg. C.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

- (1) A method for fabrication of field emission cathodes comprising:
  - (a) synthesizing conductive layer (302) on substrate (301);
  - (b) forming patterns using dielectric materials (303) as insulator by photolithography or screen-printing process; and
  - (c) selectively growing carbon **nanotubes** film arrays; and
- (2) A field emission devices comprising:
  - (a) cathode consisting of substrate, conductive layer and electron emission layer, vacuum gap and anode;
  - (b) conductive layer on substrate surface; and
  - (c) electron emission layer consisting of carbon **nanotubes** on the conductive layer.

USE - The method is for fabricating carbon **nanotube** film used in making field emission devices that are useful for flat panel display devices, vacuum electronic devices or cold cathode light source. The vacuum electronic devices comprise microwave amplifier, vacuum-electronic sensor, vacuum pressure gauge, spectrometer, electron

microscopy, or electron beam source (all claimed).

ADVANTAGE - The method provides carbon **nanotube** film possessing good electron field emission properties, lower threshold field, and high emission current density. It is performed in low temperature, thus allowing a uniform growth of carbon **nanotube** thin films over a large area. It provides field emission display devices which exhibit uniform and high density of **luminescent** spots on anode at low field using carbon **nanotube** film arrays as cathodes.

DESCRIPTION OF DRAWING(S) - The drawing shows a cross section schematic of fabricating a field emission cathode on a substrate.

Substrate 301

Conductive layer 302

Dielectric materials 303

Dwg.3a/10

FS CPI EPI GMPI

FA AB; GI; DCN

MC CPI: E05-U02; E31-P03; E31-P06D; E34-B01; E35-C; E35-F; E35-K02; E35-N; E35-Q; L02-A02B; L02-H04B; L03-G05D; N01-C03; N01-D03; N02; N03  
EPI: S02-F04D1; S03-E06B1; S03-E10A; U11-C01B; U11-C01J6; U11-C18B9; U12-B03D; U12-E01B2; V05-L01A3A; V05-M03A1; X25-A04; X26-A03C

L48 ANSWER 7 OF 10 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN

AN 2001-590096 [66] WPIX

DNN N2001-439515 DNC C2001-175071

TI Sensor system for detecting liquid analytes, useful e.g. in clinical analysis, comprises cross-reactive recognition elements that respond differently to several analytes.

DC B04 D16 E19 E24 S03

IN SCHAUER, C L; STEEMERS, F J; WALT, D R

PA (TUFT) TUFTS COLLEGE

CYC 95

PI WO 2001069245 A2 20010920 (200166)\* EN 79 G01N033-50

RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ  
NL OA PT SD SE SL SZ TR TZ UG ZW

W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK  
DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ  
LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD  
SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW

AU 2001047417 A 20010924 (200208) G01N033-50

ADT WO 2001069245 A2 WO 2001-US8126 20010314; AU 2001047417 A AU 2001-47417 20010314

FDT AU 2001047417 A Based on WO 2001069245

PRAI US 2000-189200P 20000314

IC ICM G01N033-50

ICS C12Q001-00; G01N033-566

AB WO 200169245 A UPAB: 20011113

NOVELTY - Sensor system (A) for liquid analytes (I), comprising at least one cross-reactive recognition element (CRRE), each of which interacts with more than one (I) but in different ways with each (I) to produce a detection agent (II) and/or a change for each (I), is new. (II) are analyzed and the information processed for data acquisition and interpretation.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a method for analysis of analytes, comprising contacting the analyte with (A), and analyzing the agent and/or the change for each analyte of interest, to provide interpretation data.

USE - (A), which may function as an 'artificial nose', is used to detect or analyze specific components of a mixture, e.g. in medicine or biochemistry (analysis of illicit drugs, glucose, blood gas, DNA etc.); in environmental analysis (detecting pesticides, heavy metals etc.); in



bioprocessing and food processing.

ADVANTAGE - The use of cross-reactive elements means that only a few sensors are needed to differentiate between a wide variety of (I) (using a pattern-recognition program). The use of (I)-associated enzymes as CREE makes the sensor specific for particular classes of substrates.

Dwg.0/31

FS CPI EPI

FA AB; DCN

MC CPI: B04-B04D5; B04-L01; B04-L03; B04-L04; B04-L05A; B04-L06; B04-L07; B04-L08; B05-A03B; B05-C07; B06-A03; B07-D04C; B10-A07; B11-C07B3; B11-C08; B11-C08B; B12-K04A; D05-A02C; D05-H09; D05-H10; E05-C01; E05-M; E06-A02B; E06-A03; E10-A07; E11-Q03C; E11-Q03H; E11-Q03J; E11-Q03N  
EPI: S03-E14H; S03-E14H4

L48 ANSWER 8 OF 10 ZCAPLUS COPYRIGHT 2004 ACS on STN

AN 2000:344067 ZCAPLUS

DN 132:345119

ED Entered STN: 24 May 2000

TI Multi-array, multi-specific **electrochemiluminescence** testing

IN Wohlstadter, Jacob N.; Wilbur, James; Sigal, George; Martin, Mark; Guo, Liang-hong; Fischer, Alan; Leland, Jon

PA Meso Scale Technologies, LLC, USA

SO U.S., 68 pp., Cont.-in-part of U.S. Ser. No. 402,076.

CODEN: USXXAM

DT Patent

LA English

IC ICM G01N033-543

NCL 435006000

CC 9-1 (Biochemical Methods)

Section cross-reference(s): 79, 80

FAN.CNT 6

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6066448	A	20000523	US 1996-611804	19960306 <--
	CA 2213854	AA	19960919	CA 1996-2213854	19960306 <--
	CN 1186513	A	19980701	CN 1996-193840	19960306 <--
	ZA 9601925	A	19970805	ZA 1996-1925	19960308 <--
	US 6207369	B1	20010327	US 1996-715163	19960917 <--
	US 6140045	A	20001031	US 1997-814085	19970306 <--
	US 6673533	B1	20040106	US 1997-932110	19970917 <--
	US 2001021534	A1	20010913	US 2001-771796	20010129 <--
	US 2004086423	A1	20040506	US 2003-693441	20031024 <--
PRAI	US 1995-402076	A2	19950310 <--		
	US 1995-402277	A2	19950310 <--		
	US 1996-12957P	P	19960306 <--		
	US 1996-611804	A2	19960306 <--		
	US 1996-715163	A2	19960917 <--		
	US 1997-932110	A3	19970917 <--		
AB	Materials and methods are provided for producing patterned multi-array, multi-sp. surfaces which are electronically excited for use in <b>electrochemiluminescence</b> based tests. Materials and methods are provided for the chemical and/or phys. control of conducting domains and reagent deposition for use in flat panel displays and multiply specific testing procedures. Anti-prostate specific antigen (PSA) antibody immobilized on a patterned gold electrode (preparation given) was used as an <b>electrochemiluminescent</b> sensor for immunoassay of PSA in serum samples.				
ST	multi array <b>electrochemiluminescent</b> electrode sensor; antibody immobilization electrode prostate specific antigen immunoassay				

- IT Organometallic compounds  
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)  
(as **electrochemiluminescent** labels; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT Carbon black, uses  
RL: DEV (Device component use); USES (Uses)  
(as electrode; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT Conducting polymers  
(as support; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT Electric conductors  
Electric insulators  
Felts  
Fibrous materials  
Gels  
Ionic conductors  
Semiconductor materials  
(as supports; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT Particles  
(carbon, dispersed in matrix, as electrodes; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT Immunoassay  
(chemiluminescence, electro-; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT Fibers  
RL: DEV (Device component use); USES (Uses)  
(conductive, as support; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT Matrix media  
(containing **carbon nanotubes** or **carbon black**, as electrode; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT Electrodes  
(counter; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT Silicone rubber, reactions  
RL: DEV (Device component use); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)  
(di-Me, Sylgard 184, in sensor fabrication; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT Chemiluminescent substances  
(electro-, as labels; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT Luminescence, chemiluminescence  
(**electrochemiluminescence**; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)

IT Fibril  
(electrodes; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)

IT Polyamide fibers, uses  
RL: DEV (Device component use); USES (Uses)  
(filter membrane of; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)

IT Cell  
(immobilization of; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)

IT Reagents  
RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)  
(immobilized on electrode; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)

IT Proteins, specific or class  
RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)  
(immobilized, as binding reagents; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)

IT Nucleic acids  
RL: ARG (Analytical reagent use); DEV (Device component use); RCT (Reactant); SPN (Synthetic preparation); ANST (Analytical study); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)  
(immobilized; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)

IT Optical sensors  
(immunol. biosensors; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)

IT Biosensors  
(immunol., optical; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)

IT Biosensors  
(immunosensors, optical; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)

IT Etching  
(in sensor fabrication; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)

IT Avidins  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(in sensor fabrication; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)

IT Antibodies  
RL: ARG (Analytical reagent use); DEV (Device component use); RCT (Reactant); SPN (Synthetic preparation); ANST (Analytical study); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)  
(monoclonal, immobilized; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)

- IT Membranes, nonbiological  
(nylon filters; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT Filters  
(nylon membranes; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT Analytical apparatus
  - Blood analysis
  - CCD cameras
  - Electrodes
  - Immobilization, biochemical
  - Nucleic acid hybridization
  - Optical detectors
  - Optical imaging devices
  - Photodiodes
  - Photomultipliers
  - Sensors
  - Surfactants
  - Test kits
    - (patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT Nucleic acids
  - Prostate-specific antigen
  - RL: ANT (Analyte); ANST (Analytical study)
    - (patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT Carcinoembryonic antigen
  - $\alpha$ -Fetoproteins
  - RL: ANT (Analyte); BPR (Biological process); BSU (Biological study, unclassified); ANST (Analytical study); BIOL (Biological study); PROC (Process)
    - (patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT Thiols (organic), uses
  - RL: DEV (Device component use); USES (Uses)
    - (patterned self-assembled monolayers of, binding domains of; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT Self-assembled monolayers
  - (patterned, of alkane thiols, binding domains of; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT Albumins, uses
  - RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)
    - (serum, labeled with **ruthenium** complex; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT 7440-04-2D, Osmium, organometallic compds., uses
  - 7440-18-8D, Ruthenium, organometallic compds., uses
  - RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
    - (as **electrochemiluminescent** labels; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT 7782-42-5, Graphite, uses
  - RL: DEV (Device component use); USES (Uses)
    - (electrodes; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding)

- assays)
- IT 5332-52-5, 1-Undecanethiol 130727-44-5  
 RL: DEV (Device component use); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)  
 (in sensor fabrication; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT 1892-57-5, EDAC 6066-82-6, N-Hydroxysuccinimide 9013-20-1, Streptavidin 73768-94-2 269409-10-1  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (in sensor fabrication; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT 102-69-2, Tripropylamine 111-88-6, Octylthiol 814-68-6, Acryloyl chloride  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (in sensor preparation; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT 205249-98-5P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
 (in sensor preparation; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT 7440-44-0, Carbon, uses  
 RL: DEV (Device component use); USES (Uses)  
 (nanotubes, as electrode; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT 15158-62-0D, conjugates  
 RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)  
 (patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT 269409-11-2P  
 RL: ARG (Analytical reagent use); DEV (Device component use); SPN (Synthetic preparation); ANST (Analytical study); PREP (Preparation); USES (Uses)  
 (patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT 9002-93-1, Triton X-100  
 RL: ARU (Analytical role, unclassified); ANST (Analytical study)  
 (patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT 7440-21-3, Silicon, uses  
 RL: DEV (Device component use); USES (Uses)  
 (patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)
- IT 7440-57-5, Gold, uses  
 RL: DEV (Device component use); USES (Uses)  
 (transparent film of, binding domains on; patterned multi-array, multi-sp. surfaces and porous, conductive electrodes for **electrochemiluminescence** binding assays)

RE.CNT 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 RE

- (1) Anon; WO 9005301 1990 ZCAPLUS
- (2) Anon; WO 9014221 1990 ZCAPLUS
- (3) Anon; EP 0478319 A1 1992 ZCAPLUS
- (4) Anon; WO 9214139 1992 ZCAPLUS

- (5) Anon; EP 0522677 A1 1993 ZCAPLUS
- (6) Anon; WO 9606946 1996 ZCAPLUS
- (7) Anon; WO 9639534 1996 ZCAPLUS
- (8) Carney; US 4652333 1987 ZCAPLUS
- (9) Friend; US 5098771 1992 ZCAPLUS
- (10) Guire; US 4826759 1989
- (11) Hall; US 5068088 1991 ZCAPLUS
- (12) Hubscher; US 4891321 1990
- (13) Oberhardt; US 4280815 1981 ZCAPLUS
- (14) Tennent; US 4663230 1987 ZCAPLUS
- (15) Wilson; Biosensors & Bioelectronics 1996, V11(8), P805 ZCAPLUS
- (16) Xu; J Am Chem Soc 1994, V116, P8386 ZCAPLUS
- (17) Zhang; J Phys Chem 1988, V92, P5566 ZCAPLUS
- (18) Zoski; US 5061445 1991 ZCAPLUS

L48 ANSWER 9 OF 10 ZCAPLUS COPYRIGHT 2004 ACS on STN

AN 1999:100743 ZCAPLUS

DN 130:121849

ED Entered STN: 16 Feb 1999

TI **Graphitic nanotubes** in luminescence assays

IN Massey, Richard J.; Martin, Mark T.; Dong, Liwen; Lu, Ming; Fischer, Alan; Jameison, Fabian; Liang, Pam; Hoch, Robert; Leland, Jonathan K.

PA Meso Scale Technology, USA

SO U.S., 42 pp., Cont.-in-part of U.S. Ser. No. 352,400.

CODEN: USXXAM

DT **Patent**

LA English

IC ICM G01N033-551

ICS G01N033-573; C12Q001-32; C12Q001-37

NCL 436526000

CC 9-5 (Biochemical Methods)

Section cross-reference(s): 3, 7, 15, 73, 80

FAN.CNT 3

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5866434	A	19990202	US 1996-611347	19960306 <--
	US 6203814	B1	20010320	US 1994-352400	19941208 <--
	CA 2207282	AA	19960613	CA 1995-2207282	19951208 <--
	ZA 9701915	A	19970909	ZA 1997-1915	19970305 <--
	CA 2248893	AA	19970912	CA 1997-2248893	19970305 <--
	WO 9733176	A1	19970912	WO 1997-US3653	19970305 <--
	W:				
	AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE,				
	DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ,				
	LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL,				
	PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN,				
	YU, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW:				
	GH, KE, LS, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FI, FR, GB,				
	GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN,				
	ML, MR, NE, SN, TD, TG				
	AU 9720737	A1	19970922	AU 1997-20737	19970305 <--
	AU 724509	B2	20000921		
	EP 885393	A1	19981223	EP 1997-908967	19970305 <--
	R:				
	AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,				
	IE, FI				
	CN 1217791	A	19990526	CN 1997-194334	19970305 <--
	JP 2001507787	T2	20010612	JP 1997-531989	19970305 <--
	IL 125985	A1	20020725	IL 1997-125985	19970305 <--
	RU 2189043	C2	20020910	RU 1998-116668	19970305 <--
	US 6362011	B1	20020326	US 1999-243215	19990202 <--
	US 2002086335	A1	20020704	US 2001-7526	20011205 <--

*par. 40  
this applic.*

PRAI US 1994-352400 A2 19941208 <--  
 US 1996-611347 A 19960306 <--  
 WO 1997-US3653 W 19970305 <--  
 US 1999-243215 A1 19990202 <--

AB **Graphitic nanotubes**, which include tubular fullerenes (commonly called "buckytubes") and fibrils, which are functionalized by chemical substitution, are used as solid supports in electrogenerated chemiluminescence assays. The **graphitic nanotubes** are chemical modified with functional group biomols. prior to use in an assay. Association of **electrochemiluminescent ruthenium** complexes with the functional group biomol.-modified **nanotubes** permits detection of mols. including nucleic acids, antigens, enzymes, and enzyme substrates by multiple formats.

ST **graphitic nanotube electrochemiluminescence** binding assay; tubular fullerene **nanotube** support **electrochemiluminescence** assay; biosensor **electrochemiluminescence carbon nanotube**; immunoassay **electrochemiluminescence graphitic nanotube**; **ruthenium** complex **electrochemiluminescence graphitic nanotube**

IT Separation  
 (affinity; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)

IT **Nanotubes**  
**Nanotubes**  
 RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent); USES (Uses)  
 (**carbon** fibers; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)

IT **Nanotubes**  
 RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent); USES (Uses)  
 (**carbon**; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)

IT Optical detectors  
 (chemiluminescence, electro-; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)

IT Proteins, specific or class  
 RL: ARG (Analytical reagent use); SPN (Synthetic preparation); ANST (Analytical study); PREP (Preparation); USES (Uses)  
 (conjugates, **graphitic nanotube** conjugates; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)

IT **Luminescence, chemiluminescence**  
 (detectors, electro-; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)

IT Chemiluminescence spectroscopy  
 (electro-; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)

IT Immunoassay  
**Luminescence, chemiluminescence**  
 (**electrochemiluminescence**; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)

IT Biosensors  
 (enzymic; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)

IT Avidins  
 Polyoxyalkylenes, preparation  
 RL: ARG (Analytical reagent use); SPN (Synthetic preparation); ANST (Analytical study); PREP (Preparation); USES (Uses)

- (**graphitic nanotube** conjugates; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)
- IT Biochemical molecules  
 Biosensors  
 Biotinylation  
**Electrochemical** cells  
 Electrodes  
 Electrolytes, biological  
 Immobilization, biochemical  
**Luminescence**  
**Luminescence** spectroscopy  
 Magnetic field  
 Magnetic materials  
 Nucleic acid hybridization  
 (**graphitic nanotubes** in luminescence assays of biomols. and biopolymers)
- IT Antigens  
 Biopolymers  
 Nucleic acids  
 Oligonucleotides  
 Probes (nucleic acid)  
 RL: ANT (Analyte); ANST (Analytical study)  
 (**graphitic nanotubes** in luminescence assays of biomols. and biopolymers)
- IT DNA  
 RL: ANT (Analyte); BPR (Biological process); BSU (Biological study, unclassified); ANST (Analytical study); BIOL (Biological study); PROC (Process)  
 (**graphitic nanotubes** in luminescence assays of biomols. and biopolymers)
- IT Antibodies  
 RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)  
 (**graphitic nanotubes** in luminescence assays of biomols. and biopolymers)
- IT Fullerenes  
 RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent); USES (Uses)  
 (**graphitic nanotubes** in luminescence assays of biomols. and biopolymers)
- IT Enzymes, analysis  
 RL: ARU (Analytical role, unclassified); BAC (Biological activity or effector, except adverse); BPR (Biological process); BSU (Biological study, unclassified); BUU (Biological use, unclassified); ANST (Analytical study); BIOL (Biological study); PROC (Process); USES (Uses)  
 (**graphitic nanotubes** in luminescence assays of biomols. and biopolymers)
- IT Coenzymes  
 RL: ARU (Analytical role, unclassified); BPR (Biological process); BSU (Biological study, unclassified); BUU (Biological use, unclassified); ANST (Analytical study); BIOL (Biological study); PROC (Process); USES (Uses)  
 (**graphitic nanotubes** in luminescence assays of biomols. and biopolymers)
- IT Antibodies  
 RL: ARG (Analytical reagent use); SPN (Synthetic preparation); ANST (Analytical study); PREP (Preparation); USES (Uses)  
 (immobilized; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)
- IT Antibodies  
 RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)  
 (monoclonal; **graphitic nanotubes** in luminescence



- assays of biomols. and biopolymers)
- IT **Carbon** fibers, reactions  
**Carbon** fibers, reactions  
 RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study);  
 RACT (Reactant or reagent); USES (Uses)  
 (**nanotube; graphitic nanotubes** in  
 luminescence assays of biomols. and biopolymers)
- IT 64-17-5, Ethanol, analysis 9001-40-5, Glucose 6-phosphate dehydrogenase  
 9001-62-1, Lipase 9002-07-7, Trypsin 9004-07-3, Chymotrypsin  
 9026-81-7, Nuclease 9032-92-2, Glycosidase 9035-82-9, Dehydrogenase  
 RL: ANT (Analyte); ANST (Analytical study)  
 (**graphitic nanotubes** in luminescence assays of  
 biomols. and biopolymers)
- IT 196706-39-5P 196706-40-8P  
 RL: ANT (Analyte); SPN (Synthetic preparation); ANST (Analytical study);  
 PREP (Preparation)  
 (**graphitic nanotubes** in luminescence assays of  
 biomols. and biopolymers)
- IT 7440-18-8D, Ruthenium, complexes, uses 9031-72-5,  
 Alcohol dehydrogenase  
 RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)  
 (**graphitic nanotubes** in luminescence assays of  
 biomols. and biopolymers)
- IT 9001-37-0, Glucose oxidase  
 RL: ARG (Analytical reagent use); BPR (Biological process); BSU  
 (Biological study, unclassified); ANST (Analytical study); BIOL  
 (Biological study); PROC (Process); USES (Uses)  
 (**graphitic nanotubes** in luminescence assays of  
 biomols. and biopolymers)
- IT 15158-62-0  
 RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study);  
 RACT (Reactant or reagent); USES (Uses)  
 (**graphitic nanotubes** in luminescence assays of  
 biomols. and biopolymers)
- IT 541-59-3DP, Maleimide, **graphitic nanotube** conjugates  
 5591-94-6P 196706-38-4P  
 RL: ARG (Analytical reagent use); RCT (Reactant); SPN (Synthetic  
 preparation); ANST (Analytical study); PREP (Preparation); RACT (Reactant  
 or reagent); USES (Uses)  
 (**graphitic nanotubes** in luminescence assays of  
 biomols. and biopolymers)
- IT 52-90-4DP, L-Cysteine, **graphitic nanotube** conjugates  
 53-84-9DP, NAD, analogs, **graphitic nanotube** conjugates  
 56-45-1DP, L-Serine, **graphitic nanotube** conjugates  
 56-84-8DP, L-Aspartic acid, **graphitic nanotube**  
 conjugates 56-86-0DP, L-Glutamic acid, **graphitic**  
**nanotube** conjugates 60-18-4DP, L-Tyrosine, **graphitic**  
**nanotube** conjugates 72-19-5DP, L-Threonine, **graphitic**  
**nanotube** conjugates 107-15-3DP, 1,2-Ethanediamine,  
**graphitic nanotube** conjugates, preparation  
 9013-20-1DP, Streptavidin, **graphitic nanotube**  
 conjugates 15746-57-3DP, **graphitic nanotube**  
 conjugates 25322-68-3DP, **graphitic nanotube**  
 conjugates 196706-41-9DP, **graphitic nanotube**  
 conjugates 196706-42-0DP, **graphitic nanotube**  
 conjugates  
 RL: ARG (Analytical reagent use); SPN (Synthetic preparation); ANST  
 (Analytical study); PREP (Preparation); USES (Uses)  
 (**graphitic nanotubes** in luminescence assays of  
 biomols. and biopolymers)

IT 2418-95-3 13139-17-8 196706-37-3  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (graphitic nanotubes in luminescence assays of  
 biomols. and biopolymers)

IT 2389-60-8P 128972-27-0P 196706-37-3DP, amide protecting group  
 terminated  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT  
 (Reactant or reagent)  
 (graphitic nanotubes in luminescence assays of  
 biomols. and biopolymers)

IT 7440-44-0, Carbon, reactions  
 RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study);  
 RACT (Reactant or reagent); USES (Uses)  
 (nanotubes; graphitic nanotubes in  
 luminescence assays of biomols. and biopolymers)

RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Kampe; US 5554751 1996 ZCAPLUS
- (2) Keana; US 5582955 1996 ZCAPLUS
- (3) Richmond; US 5310669 1994 ZCAPLUS
- (4) Ruoff; US 5547748 1996

L48 ANSWER 10 OF 10 ZCAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1

AN 1997:618265 ZCAPLUS

DN 127:275017

ED Entered STN: 27 Sep 1997

TI Graphitic nanotubes in luminescence assays

IN Massey, Richard J.; Martin, Mark T.; Dong, Liwen; Lu, Ming; Fischer, Alan;  
 Jameison, Fabian; Liang, Pam; Hoch, Robert; Leland, Jonathon K.

PA Igen, Inc., USA

SO PCT Int. Appl., 118 pp.

CODEN: PIXXD2

DT Patent

LA English

IC ICM G01N033-573

ICS G01N033-553; C07K016-44

CC 9-5 (Biochemical Methods)

Section cross-reference(s): 3, 7, 15, 73, 80

FAN.CNT 3

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9733176	A1	19970912	WO 1997-US3653	19970305 <--
W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, KE, LS, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
US 5866434	A	19990202	US 1996-611347	19960306 <--
AU 9720737	A1	19970922	AU 1997-20737	19970305 <--
AU 724509	B2	20000921		
EP 885393	A1	19981223	EP 1997-908967	19970305 <--
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
JP 2001507787	T2	20010612	JP 1997-531989	19970305 <--
IL 125985	A1	20020725	IL 1997-125985	19970305 <--
RU 2189043	C2	20020910	RU 1998-116668	19970305 <--
PRAI US 1996-611347	A	19960306 <--		

*pat. to this  
applic.*

US 1994-352400 A2 19941208 <--  
 WO 1997-US3653 W 19970305 <--

AB **Graphitic nanotubes**, which include tubular fullerenes (commonly called "buckytubes") and fibrils, which are functionalized by chemical substitution, are used as solid supports in electrogenerated chemiluminescence assays. The **graphitic nanotubes** are chemical modified with functional group biomols. prior to use in an assay. Association of **electrochemiluminescent ruthenium** complexes with the functional group biomol.-modified **nanotubes** permits detection of mols. including nucleic acids, antigens, enzymes, and enzyme substrates by multiple formats.

ST **graphitic nanotube electrochemiluminescence** binding assay; tubular fullerene **nanotube** support **electrochemiluminescence** assay; biosensor **electrochemiluminescence carbon nanotube**; immunoassay **electrochemiluminescence graphitic nanotube**; **ruthenium** complex **electrochemiluminescence graphitic nanotube**

IT Separation  
 (affinity; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)

IT **Nanotubes**  
**Nanotubes**  
 RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent); USES (Uses)  
 (carbon fibers; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)

IT **Nanotubes**  
 RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent); USES (Uses)  
 (carbon; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)

IT Optical detectors  
 (chemiluminescence, electro-; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)

IT **Luminescence, chemiluminescence**  
 (detectors, electro-; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)

IT Chemiluminescence spectroscopy  
 (electro-; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)

IT Immunoassay  
 (electrochemiluminescence; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)

IT Biosensors  
 (enzymic; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)

IT Avidins  
 Polyoxyalkylenes, preparation  
 Proteins, general, preparation  
 RL: ARG (Analytical reagent use); SPN (Synthetic preparation); ANST (Analytical study); PREP (Preparation); USES (Uses)  
 (**graphitic nanotube** conjugates; **graphitic nanotubes** in luminescence assays of biomols. and biopolymers)

IT Biochemical molecules  
 Biosensors  
 Biotinylation  
**Electrochemical** cells  
 Electrodes  
 Electrolytes, biological

Immobilization, biochemical  
     **Luminescence** spectroscopy  
 Magnetic field  
 Magnetic materials  
 Nucleic acid hybridization  
     (**graphitic nanotubes** in luminescence assays of  
     biomols. and biopolymers)  
 IT Antigen  
     Biopolymers  
     Nucleic acids  
     Oligonucleotides  
     Probes (nucleic acid)  
     RL: ANT (Analyte); ANST (Analytical study)  
     (**graphitic nanotubes** in luminescence assays of  
     biomols. and biopolymers)  
 IT Antibodies  
     RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)  
     (**graphitic nanotubes** in luminescence assays of  
     biomols. and biopolymers)  
 IT Fullerenes  
     RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study);  
     RACT (Reactant or reagent); USES (Uses)  
     (**graphitic nanotubes** in luminescence assays of  
     biomols. and biopolymers)  
 IT Antibodies  
     RL: ARG (Analytical reagent use); SPN (Synthetic preparation); ANST  
     (Analytical study); PREP (Preparation); USES (Uses)  
     (immobilized; **graphitic nanotubes** in luminescence  
     assays of biomols. and biopolymers)  
 IT Antibodies  
     RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)  
     (monoclonal; **graphitic nanotubes** in luminescence  
     assays of biomols. and biopolymers)  
 IT **Carbon** fibers, reactions  
     **Carbon** fibers, reactions  
     RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study);  
     RACT (Reactant or reagent); USES (Uses)  
     (**nanotube; graphitic nanotubes** in  
     luminescence assays of biomols. and biopolymers)  
 IT 64-17-5, Ethanol, analysis 9001-40-5, Glucose 6-phosphate dehydrogenase  
     9001-62-1, Lipase 9002-07-7, Trypsin 9004-07-3, Chymotrypsin  
     9026-81-7, Nuclease 9032-92-2, Glycosidase 9035-82-9, Dehydrogenase  
     RL: ANT (Analyte); ANST (Analytical study)  
     (**graphitic nanotubes** in luminescence assays of  
     biomols. and biopolymers)  
 IT 196706-39-5P 196706-40-8P  
     RL: ANT (Analyte); SPN (Synthetic preparation); ANST (Analytical study);  
     PREP (Preparation)  
     (**graphitic nanotubes** in luminescence assays of  
     biomols. and biopolymers)  
 IT **7440-18-8D, Ruthenium**, complexes, uses 9031-72-5,  
     Alcohol dehydrogenase  
     RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)  
     (**graphitic nanotubes** in luminescence assays of  
     biomols. and biopolymers)  
 IT 9001-37-0, Glucose oxidase  
     RL: ARG (Analytical reagent use); BPR (Biological process); BSU  
     (Biological study, unclassified); ANST (Analytical study); BIOL  
     (Biological study); PROC (Process); USES (Uses)  
     (**graphitic nanotubes** in luminescence assays of

biomols. and biopolymers)

IT 15158-62-0  
 RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study);  
 RACT (Reactant or reagent); USES (Uses)  
 (**graphitic nanotubes** in luminescence assays of  
 biomols. and biopolymers)

IT 541-59-3DP, Maleimide, **graphitic nanotube** conjugates  
 5591-94-6P 196706-38-4P  
 RL: ARG (Analytical reagent use); RCT (Reactant); SPN (Synthetic  
 preparation); ANST (Analytical study); PREP (Preparation); RACT (Reactant  
 or reagent); USES (Uses)  
 (**graphitic nanotubes** in luminescence assays of  
 biomols. and biopolymers)

IT 52-90-4DP, L-Cysteine, **graphitic nanotube** conjugates,  
 preparation 53-84-9DP, NAD, analogs, **graphitic**  
**nanotube** conjugates 56-45-1DP, L-Serine, **graphitic**  
**nanotube** conjugates, preparation 56-84-8DP, L-Aspartic acid,  
**graphitic nanotube** conjugates, preparation 56-86-0DP,  
 L-Glutamic acid, **graphitic nanotube** conjugates,  
 preparation 60-18-4DP, L-Tyrosine, **graphitic nanotube**  
 conjugates, preparation 72-19-5DP, L-Threonine, **graphitic**  
**nanotube** conjugates, preparation 107-15-3DP, 1,2-Ethanediamine,  
**graphitic nanotube** conjugates, preparation  
 9013-20-1DP, Streptavidin, **graphitic nanotube**  
 conjugates 15746-57-3DP, **graphitic nanotube**  
 conjugates 25322-68-3DP, **graphitic nanotube**  
 conjugates 196706-41-9DP, **graphitic nanotube**  
 conjugates 196706-42-0DP, **graphitic nanotube**  
 conjugates  
 RL: ARG (Analytical reagent use); SPN (Synthetic preparation); ANST  
 (Analytical study); PREP (Preparation); USES (Uses)  
 (**graphitic nanotubes** in luminescence assays of  
 biomols. and biopolymers)

IT 2418-95-3 13139-17-8 196706-37-3  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (**graphitic nanotubes** in luminescence assays of  
 biomols. and biopolymers)

IT 2389-60-8P 128972-27-0P 196706-37-3DP, amide protecting group  
 terminated  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT  
 (Reactant or reagent)  
 (**graphitic nanotubes** in luminescence assays of  
 biomols. and biopolymers)

IT 7440-44-0, **Carbon**, reactions  
 RL: ARG (Analytical reagent use); RCT (Reactant); ANST (Analytical study);  
 RACT (Reactant or reagent); USES (Uses)  
 (**nanotubes; graphitic nanotubes** in  
 luminescence assays of biomols. and biopolymers)

=> b home

FILE 'HOME' ENTERED AT 16:16:53 ON 10 JUN 2004

Connecting via Winsock to STN

Welcome to STN International! Enter x:x

Searched by P. Ruppel

LOGINID:ssspat01plr

PASSWORD:

\* \* \* \* \* RECONNECTED TO STN INTERNATIONAL \* \* \* \* \*  
SESSION RESUMED IN FILE 'HOME' AT 16:25:15 ON 10 JUN 2004  
FILE 'HOME' ENTERED AT 16:25:15 ON 10 JUN 2004

=> b zcaplus

FILE 'ZCAPLUS' ENTERED AT 16:25:19 ON 10 JUN 2004  
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FILE LAST UPDATED: 9 Jun 2004 (20040609/ED)

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=> d his

(FILE 'HOME' ENTERED AT 13:52:46 ON 10 JUN 2004)

FILE 'ZCAPLUS' ENTERED AT 13:52:53 ON 10 JUN 2004  
L1 1 US20020086335/PATS

FILE 'REGISTRY' ENTERED AT 14:33:37 ON 10 JUN 2004  
E RHENIUM/CN

FILE 'ZCAPLUS' ENTERED AT 14:33:53 ON 10 JUN 2004  
E NANOTUBES/CT  
E E3+ALL  
L2 13027 E4+OLD,NT  
E NANOTUBES/CT  
E E4+ALL  
E LUMINESCENCE/CT  
E E3+ALL  
L3 133647 LUMINESCENCE/CT,CW  
E LUMINESCENCE SPECTROSCOPY/CT  
E E3+ALL  
E ELECTROCHEMICAL CELLS/CT  
E E3+ALL  
L4 286864 ?ELECTROCHEM?/BI  
L5 416961 L3 OR L4  
L6 726 L2 AND L5

FILE 'REGISTRY' ENTERED AT 14:40:08 ON 10 JUN 2004

Searched by P. Ruppel

E RUBIDIUM/CN  
L7                  1 E3  
                  E OSMIUM/CN  
L8                  1 E3  
                  E RHENIUM/CN  
L9                  1 E3  
  
FILE 'ZCAPLUS' ENTERED AT 14:41:04 ON 10 JUN 2004  
L10                 61375 L7-L9  
L11                  3 L6 AND L10  
  
FILE 'REGISTRY' ENTERED AT 14:43:56 ON 10 JUN 2004  
                  E RUTHENIUM/CN  
L12                  1 E3  
  
FILE 'ZCAPLUS' ENTERED AT 14:44:24 ON 10 JUN 2004  
L13                 47421 L8-L9 OR L12  
L14                  9 L6 AND L13  
L15                 118115 RUTHENIUM? OR OSMIUM? OR RHENIUM?  
L16                 122481 L13 OR L15  
L17                 16759 ?NANOTUBE?/BI  
L18                 16801 L17 OR L2  
L19                 14468 L18(L) (CARBON? OR GRAPHIT?)  
L20                  759 L5 AND L19  
L21                  22 L20 AND L16  
                  SAVE TEMP L21 CEPPERLY526S1/A CEPP526S1/A  
L22                  6 L21 AND P/DT  
  
FILE 'WPIX' ENTERED AT 15:05:04 ON 10 JUN 2004  
L23                  1 US2002008635  
L24                  0 US20020086335  
                  E NANOTUBE/CT  
                  E CARBON NANOTUBE/CT  
                  E GRAPHITIC NANOTUBE/CT  
                  E NANOTECHNOLOGY/CT  
L25                 1733 NANOTUBE?/BIX  
                  E LUMINESCENCE/CT  
L26                 21895 LUMINESCEN?/BIX  
L27                 43565 ?LUMINESCEN?/BIX  
L28                  49 L27 AND L25  
L29                 15745 (RUTHENIUM? OR OSMIUM? OR RHENIUM?)/BIX  
L30                  5 L29 AND L28  
                  SAVE TEMP L30 CEPP526S2/A  
  
FILE 'STNGUIDE' ENTERED AT 15:44:54 ON 10 JUN 2004  
  
FILE 'WPIX' ENTERED AT 15:49:19 ON 10 JUN 2004  
  
FILE 'STNGUIDE' ENTERED AT 15:49:44 ON 10 JUN 2004  
  
FILE 'REGISTRY' ENTERED AT 15:51:15 ON 10 JUN 2004  
                  E NADH/CN  
L31                  1 E3  
  
FILE 'ZCAPLUS' ENTERED AT 15:52:09 ON 10 JUN 2004  
L32                  0 NICOTINAMIDE AND L21  
L33                 12627 58-68-4/RN  
L34                  0 L33 AND L21  
                  SAVE TEMP L32 CEPP526S3/A  
L35                 25029 ?NICOTINAMIDE?/BI

L36 35881 L35 OR L33  
 L37 102945 NAD?  
 L38 119987 L37 OR L36  
 L39 2 L38 AND L21  
 L40 154144 ?DEHYDROGENASE?/BI  
 L41 2 L40 AND L39  
 L42 2 L41 AND L21  
 SAVE TEMP L42 CEPP526S4/A  
 L43 2 L42 OR L39  
 L44 6 L22 AND (PY<=2001 OR PRY<=2001 OR AY<=2001)  
 L45 1 ECL/TI AND L44

FILE 'ZCAPLUS, WPIX' ENTERED AT 16:10:26 ON 10 JUN 2004

L46 6 DUP REM L45 L30 (0 DUPLICATES REMOVED)

L47 10 DUP REM L30 L44 (1 DUPLICATE REMOVED)

FILE 'ZCAPLUS' ENTERED AT 16:15:41 ON 10 JUN 2004

FILE 'WPIX' ENTERED AT 16:15:56 ON 10 JUN 2004

FILE 'ZCAPLUS, WPIX' ENTERED AT 16:16:11 ON 10 JUN 2004

L48 10 DUP REM L44 L30 (1 DUPLICATE REMOVED)

FILE 'HOME' ENTERED AT 16:16:53 ON 10 JUN 2004

FILE 'ZCAPLUS' ENTERED AT 16:25:19 ON 10 JUN 2004

=> ?chemilum?/bi

L49 28694 ?CHEMILUM?/BI

=> l5 or l49

L50 433906 L5 OR L49

=> ?nanotub?/bi

L51 16891 ?NANOTUB?/BI

=> l51 or l2

L52 16928 L51 OR L2

=> l52 and l51

L53 16891 L52 AND L51

=> l19 and l50

L54 761 L19 AND L50

=> l16 and l54

L55 22 L16 AND L54

=> l55 and (PY<=2001 OR PRY<=2001 OR AY<=2001)

21548796 PY<=2001

3292126 PRY<=2001

3369183 AY<=2001

L56 10 L55 AND (PY<=2001 OR PRY<=2001 OR AY<=2001)

=> l56 and p/dt

4364052 P/DT

L57 6 L56 AND P/DT

=> log h

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